Find a polynomial curve $y = P(x)$ that passes through three points $(1, 2), (2, -1), (4, 3)$.

```
xdata = [1,2,4];
ydata = [2,-1,3];
```

Define the Lagrange interpolation polynomial $P(x)$:

```
syms x %declare that x is a symbolic variable
L0 = @(x) (x-2)*(x-4)/((1-2)*(1-4));
L1 = @(x) (x-1)*(x-4)/((2-1)*(2-4));
L2 = @(x) (x-1)*(x-2)/((4-1)*(4-2));
P = @(x) 2*L0(x)+(-1)*L1(x)+3*L2(x);
```

If you want the polynomial to be in standard form (sum of descending power of x, use the command:

```
simplify(P(x))
```

```
ans =
```

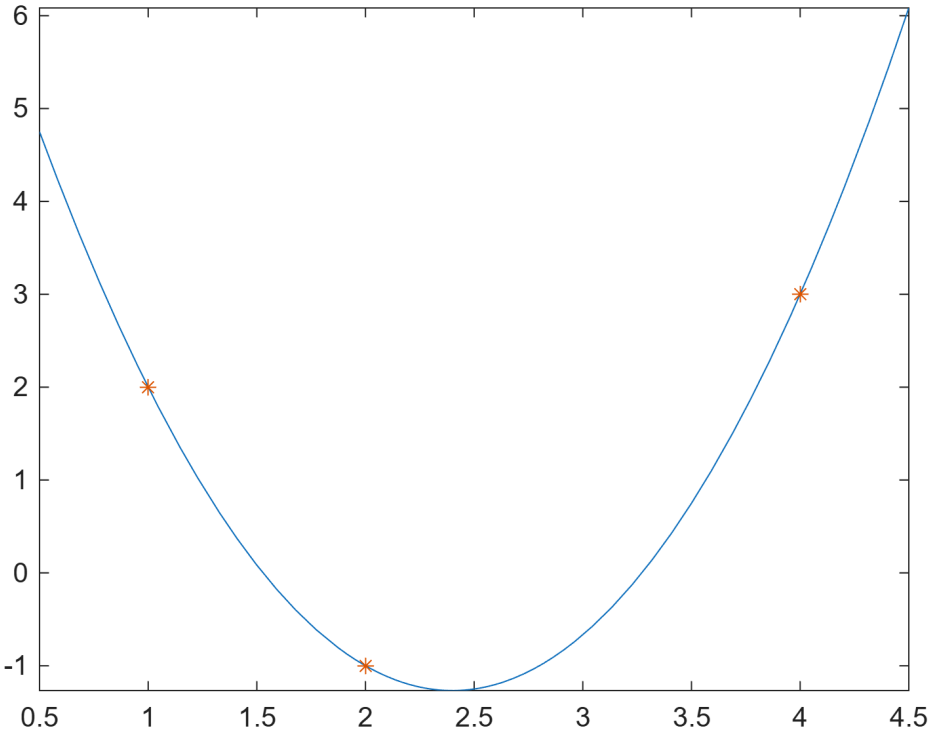
$$\frac{5\,x^2}{3} - 8\,x + \frac{25}{3}$$

Plot the polynomial $P(x)$ on interval $[0.5,\ 4.5]$ together with the three given data points.

```
fplot(P,[.5,4.5]);
```

```
Warning: Function behaves unexpectedly on array inputs. To improve performance, properly vectorize
your function to return an output with the same size and shape as the input arguments.
```

```
hold on
plot(xdata,ydata,'*')
```


6
5
4
3
2
1
0
-1
0.5
1
1.5
2
2.5
3
3.5
4
4.5